

## **REMARKS**

The Office Action of April 30, 2008 has been carefully studied. In response thereto, it is seen that claim 1 is amended, claims 2 and 7 cancelled and claims 13-19 added.

The following paragraphs correspond to the order of the paragraphs of the Office Action:

### ***Claim Rejections - 35 U.S.C. § 112***

Claim 1 is now amended by changing the expression "said presulfurized catalyst" to --a presulfurized catalyst--.

### ***Claim Rejections - 35 U.S.C. § 103***

The present invention is directed to the *ex situ* preparation of hydroconversion catalysts, especially hydrotreatment catalysts such as those having an alumina support and molybdenum and cobalt as the catalytic metals (new claim 15). A fresh catalyst (new claim 13) is prepared, as indicated in Example 4 of the application by sulfurization *ex situ* and unless a passivation step is conducted, there is the danger that the *ex situ* catalyst will either be pyrophoric or have too low a critical self-heating temperature (TCAE). Heretofore, *ex situ* passivation was utilized, but was conducted under conditions which did not sufficiently passivate the catalyst so as to make it clearly less of a hazard during transportation and use in a hydroconversion unit.

The first named inventor of the present application is Pierre Dufresne and his earlier cited U.S. Patent 6,059,956 realistically sets forth the closest prior art since it addresses *ex situ* sulfurization and *ex situ* passivation of a hydrotreating catalyst, but it does not set forth the critical operating conditions for passivation: a temperature between 75 and 120°C and an oxygen partial pressure of at least 7 kPa. These conditions are critical and lead to critical self-heating temperatures (TCAE) of at least 100°C along with both satisfactory activities and relative weight activities (RWA). Referring to pages 12 and 13 of the present application, the table on page 12 shows catalysts SP5, SP6, SP7 and SP8 having the desired properties, noting the values of TCAE significantly exceeding 100°C.

With respect to the rejections set forth in the Office Action under 35 U.S.C. § 103, Applicants have studied these references, but respectfully submit that they do not suggest the

subtle but very important improvement provided by the present invention. In support of this contention, the following discussion of the references is presented for the Examiner's consideration:

***Hansford et al. 3,287,257***

Noting that the title of this patent is "Activation Of Hydrocarbon Conversion Catalysts Employed In The Hydrocracking Of Hydrocarbons", it is respectfully submitted that one of ordinary skill in the art looking to improve a passivation step would not be drawn particularly to this patent which does not have the word "passivation" mentioned therein. The main thrust of the patent is to provide a process for dispersing agglomerated noble metal particles on a crystalline molecular sieve zeolite base after the catalyst has been utilized. The technique employed to disperse agglomerates having a particle size greater than 30A is to sulfide the catalyst at temperatures above 500°F and then subject the sulfided catalyst to oxidation at even higher temperatures, with suitable oxidation temperatures being in the range of about 600° to 1200°F (column 4, lines 19 and 20). In addition, on column 4 the sentence on lines 20-26 alluded to in the Office Action, is repeated, as follows:

"In cases where combination deposits are present, or in the case of catalysts containing relatively large amounts of metal sulfide, it may be desirable to employ initially more dilute oxygen-containing gases, and/or to initiate the oxidation at relatively low temperatures, going to higher temperatures for completion." (Emphasis added).

By no stretch of the imagination does this reference suggest to one of ordinary skill in the art that the oxidation conditions should be conducted so as to passivate the catalyst in order to avoid hazardous conditions upon use, much less employ a temperature of 75-120°C.

It is also noted that in the examples the treatment under an oxygen atmosphere is a calcination as explicitly mentioned on column 6, line 11. This calcination step is also referred to as activation, which is not to be confused with Applicants' invention which is directed to passivation. In any case, one of ordinary skill in the art interested in complying with the UN

standards (Code IMDG) as referred to on page 5, middle paragraph of the present application would hardly be drawn to any of the teachings of this reference.

***Eijsbouts et al. U.S. 6,753,291***

This reference is pertinent insofar as on column 5, lines 15-31 there is a discussion of passivation of a sulfided catalyst, including passivation with air as a well-known embodiment. These lines of the patent refer to a number of patents and literature articles regarding the use of oxygen, but none of them suggests Applicants important contribution regarding the operating conditions necessary to achieve the critical self-heating temperatures coupled with acceptable activities and relative weight activities as explained and on pages 12 and 13 of the instant application. More specifically, the references set forth in U.S. 6,753,291, column 5, lines 25-31 teach the following:

EP-897748 (corresponding to U.S. 6,294,498) describes a process for passivation of a catalyst wherein the particles of catalyst are coated with an hydrocarbonated compound (as lubes, waxes...). NL 8900914 also uses hydrocarbon.

Louwers, Journal of catalysis, 144-(1993) describes a process for preparing an hydrotreatment catalyst, including a passivation and then a sulfurization. More precisely, the sole conditions which are disclosed are 1) an atmosphere of 5%O<sub>2</sub> in He (partial P of O<sub>2</sub>=5kPa) and 2) a temperature of 50°C. An alternative is the use of air at ambient temperature.

Browne and Louwers, Catalysis Today does not add any pertinent information.

In summary, one skilled in the art is provided with no other information concerning the referred to passivation conditions except to use coatings, or to use a reduced oxygen atmosphere in helium of 5 kPa combined with an ambient temperature or a temperature of 50°C, both values substantially lower than the critical values set forth in Applicants' claims. Accordingly, U.S. 6,753,291 and the references cited therein, if anything, teach away from the critical conditions employed in the present invention for the purposes of complying with the UN standard.

***Pegels (4,029,599)***

The invention set forth in this patent is based on the observation that in a

hydrodesulfurization reactor, the quantity of catalyst on which solid particles have been deposited becomes very large compared to the quantity of catalysts on which the deposition has occurred, and therefore it is inefficient to regenerate the entire batch of catalysts and to a detrimental oxidation of metal sulfides. Furthermore, it was also observed that when a low temperature inert gas was used for purging a reactor for a long period of time and the reactor is subsequently opened, the catalyst has a pyrophoric character, making it impossible or dangerous to work in or on the reactor.

To avoid the danger, the patent teaches the use of a fully controlled oxidation so as to maintain the temperature of the reactor below 300°C. More specifically, as seen from the summary of the invention bridging columns 2 and 3, the feed to the reactor is discontinued and the reactor is purged with inert gas and subsequently an oxygen containing gas is introduced into the purged gas such that the initial oxygen content of the purged gas is at most 1% by volume and this percentage is gradually increased until the oxygen partial pressure of the purged gas is brought to at least 0.2 kg/m<sup>2</sup> (20kPa). It is also stated in the patent (column 6, lines 51-54) that by virtue of the use of the passivation compared to the use of regeneration, the catalyst need not be resulfided. In other words, the patented invention contemplates neither *ex situ* passivation nor resulfidation, much less *ex situ* sulfidation. Consequently, it is respectfully submitted that to one of ordinary skill in the art interested in providing a passivation process in an *ex situ* system wherein *ex situ* passivation is employed as well as *ex situ* sulfidation (new claims 18, 19 and 20), the teachings of Pegels 4,029,599 would not be relevant. Furthermore, it is seen that new claims 13 and 20 require that the process of the present invention be applied to fresh catalysts, support being implicitly found in the specification on page 4, Example 1 as well as on page 13, seventh line from the bottom.

With respect to the temperature of the passivation step, it is noted that Example 1 of the reference (column 8, lines 23-24) indicates that the purged gas was continuously 15°C at the moment it left the reactor. With respect to Example 2, although there is no specific mention of the temperature at which the passivation was conducted, the last two sentences of the example make it clear that whatever operating conditions were used, they were unsatisfactory. In Example 3, the reactor was taken off stream, but again there is no mention of the temperature of

the passivation step. Conversely, a partial pressure of only 1% by volume of oxygen (a partial pressure of about 1 kPa) was sufficient to result in a catalyst which was not pyrophoric and in which there was no undesired oxidation of coke. Consequently, the statement in the reference that the temperature of the purged gas discharged from the reactor remains below 150°C does not realistically provide any guidance to one of ordinary skill in the art since the only acceptable example specifying the temperature of the purged gas specifies a temperature of 15°C. Certainly, then, there is nothing in this reference which would teach one of ordinary skill in the art to utilize a critical temperature between 75°C and 120°C as set forth in Applicants' claim 1. It is also seen that new claim 22 requires the operating condition to result in a catalyst having a critical self heating temperature of over 100°C.

Finally, it is respectfully submitted that the discursive teachings of Pegels relating to a passivation step within a reactor (*in situ*) would not at all be suggestive to one of ordinary skill in the art to combine any of the teachings therein with any *ex situ* processes in the prior art. The Examiner is courteously reminded that it is improper to pick and choose parts of various references and combine them in an artificial manner in order to attempt to reconstruct an Applicants' invention. In particular, it is respectfully submitted that the basic reference is that of Pierre Dufresne, mentioned above, and that in the absence of the present disclosure, there would be no suggestion, teaching or motivation or common sense to combine any of the teachings set forth in the Office Action with the former invention of Pierre Dufresne in order to reconstitute his present invention.

In view of the above remarks, favorable reconsideration is courteously requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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